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Bodenerosion

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Titel
Soil loss by wind (SoLoWind): a new GIS-based model to identify risk areas

Abstract
The focus of wind erosion studies in Germany is located in the Northern and Eastern parts of the country, where wind erosion is a major soil threat and environmental concern. One of the most susceptible regions not only within Germany, but also within Europe (1, 2) is Western Saxony even though no high resolution erosion risk map exists for that region yet. A new wind erosion model for modeling soil loss by wind called SoLoWind was developed and tested for Western Saxony (3). SoLoWind extends the existing DIN model (DIN standard 19706) applied by the public authorities in Germany to a multidirectional model with new causal factors. The new factors are combined by fuzzy logic with the original DIN factors into four modules. The "Natural Wind Erosions Susceptibility" (SUS) module determines the regional soil erodibility with respect to soil texture, soil organic content, soil moisture and wind speeds. A "Soil Cover" (COV) module distinguishes between bare soil and covered soil in satellite images. Furthermore, the modules "Mean Field Length" (MFL) and "Mean Protection Zones" (MPZ) are parameters for the wind erosions avalanching effect and sheltering of windbreaks. Both modules are weighted according to the frequency of wind directions. The application showed that about one-third of all arable land in Western Saxony have either high (26.9%) or very high soil erosion risk (3.6%) by wind. As such, wind erosion is a serious land degradation threat for the region as it is in the adjacent federal states. According to the modeled off-site effects of wind erosion, a potential danger of reduced visibility by windblown dust to sections of the highway A72 could clearly be identified which calls for immediate protection measures. The transparency, adaptability, and user-friendliness of the model suggest that SoLoWind might serve as a planning tool for soil conservation strategies not merely in Western Saxony, but also in other regions.

Literatur
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